



Winston H. Hickox  
Agency Secretary  
California Environmental  
Protection Agency

## Department of Toxic Substances Control

Edwin F. Lowry, Director  
Hazardous Materials Laboratory  
2151 Berkeley Way, Room 515  
Berkeley, California 94704



Gray Davis  
Governor

### MEMORANDUM

TO: Gerard Abrams  
Department of Toxic Substances Control  
8800 Cal Center Drive  
Sacramento, CA 95826

FROM: Fred Seto, Ph.D.  
Hazardous Materials Laboratory  
Department of Toxic Substances Control  
2151 Berkeley Way, Room 515  
Berkeley, CA 94704

DATE: September 24, 2003

SUBJECT: DATA REVIEW OF PERCHLORATE TEST RESULTS FOR SAMPLES  
COLLECTED AT BATHTUB WELL #1, BRANDEIS BARDIN, FOR THE  
BOEING ROCKETDYNE PROJECT (Amended-September 24, 2003)

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*This amended memorandum updates a previous memorandum with some newly acquired information. It supercedes the memorandum dated August 13, 2003.*

#### Introduction:

Groundwater samples were collected at Bathtub Well #1, Brandeis Bardin, near the Boeing Rocketdyne Site, over a period of several months. The collected samples were analyzed by Weck Laboratories (Weck), American Scientific Laboratories (ASL) which subcontracted the perchlorate analysis to Advanced Technology Laboratories (ATL), and the Hazardous Materials Laboratory (HML) of the Department of Toxic Substances Control. The dates of sample collection, the lab sample identification number, the test results and the analyzing laboratories are summarized in Table 1. As shown in Table 1, a sample collected on 2-21-03 and analyzed by Weck was initially reported as containing 82 ug/L perchlorate. Four samples analyzed by ASL/ATL showed perchlorate concentrations ranging from 36 to 150 ug/L. Three samples analyzed by HML showed non-detect (ND) for perchlorate. Of four samples collected on 6-11-03, two samples analyzed by ASL/ATL indicated the presence of perchlorate at 36 ug/L and 39 ug/L, while the other two samples analyzed by HML indicated the absence of perchlorate by non-detect. Therefore, HML was asked to evaluate the data packages associated with the various sample perchlorate tests.

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## Data Evaluation

HML collected the data packages available from the three different laboratories. We evaluated the holding times, initial calibration, instrument performance check, initial calibration check, continuing calibration check, method blank, laboratory control sample, matrix spike/matrix spike duplicate, and identification and quantitation according to the quality control requirements of Method 314.0.

Where feasible, we requested the relevant laboratory to perform additional sample analyses and confirmation tests.

## Weck Sample

The quality assurance/quality control (QA/QC) review summary is shown in Table 2. The quality control results appear to be acceptable except the identification and quantitation. For identification, we compared the retention time of the identified perchlorate peak with the average retention time of the known perchlorate samples. For the day of sample analysis, we calculated the average retention time of the known perchlorate peaks based on runs as indicated below to be 11.83 min.

<u>Sample</u>	<u>Retention Time (RT)</u> <u>(ug/L)</u>	<u>Concentration of</u> <u>Perchlorate</u>
CCCS - 20 ppb	11.8	19.014
Laboratory Control Sample	11.83	18.652
Sample ID 3022540-01	11.23	82.254
CCCS - 40 ppb	11.92	36.113
Matrix Spike – 20 ppb	11.83	21.140
Matrix Spike Duplicate – 20 ppb	11.82	21.011
CCCS – 20 ppb	11.80	18.122

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CCCS = Continuing Calibration Check Standard

Average RT of Known Perchlorate Peaks (not including sample) = 11.83

RT of Identified Perchlorate Peak in Sample ID. 3022540-01 = 11.23

The retention time of the peak identified as perchlorate in the sample run has a retention time of 11.23 min. Thus the retention time difference between the average retention time of the known perchlorate peaks and the identified perchlorate peak in the sample is 0.60 min. This is equivalent to about 5.07% of the average retention time of the known perchlorate peaks.

Since the retention time window is specified in Method 314.0 to be not more than 5% of the average retention time of the perchlorate standards, the 5.07% is just near the lower limit of the retention window. So, HML staff contacted Weck on July 16, 2003 to clarify

this matter. We asked Weck staff if they performed any confirmatory test such as spiking the sample, a second column confirmation, or Ion Chromatography/Mass Spectrometry test. They stated that no confirmatory test was performed. Additionally, it is impossible to conduct any confirmatory test because the original sample was disposed of. Weck staff decided to revise their original report to change the sample result from a positive 82 ug/L to non-detect. Unfortunately, the original sample was already disposed of. Otherwise, a confirmatory test could have revealed whether or not perchlorate was present in the sample in question.

#### ASL/ATLSamples

The quality assurance/quality control (QA/QC) review summary is shown in Table 2. The quality control results are generally acceptable. As mentioned above and indicated in Table 1, four samples analyzed by ASL/ATL have perchlorate with values ranging from 36 ug/L to 150 ug/L. Since the original samples are still available and to verify the positive results, we requested ASL/ATL analyze the samples again and also analyze the samples spiked with known amounts of standard perchlorate. Furthermore, the four samples (ID.109814, ID.109815, ID.110624 and ID.110625) were shipped to and were analyzed by HML using Method 314.0. Additionally, they were analyzed by the Sanitation and Radiation Laboratory (SRL) of the Department of Health Services using Ion Chromatography/Mass Spectrometry. The test results of the four samples are summarized below.

<u>Date Analyzed</u>	<u>Laboratory</u>	<u>Perchlorate (ug/L) of samples</u>			
		ID. 109814	ID. 109815	ID. 110624	ID.110625
6-05-03	ASL/ATL	150	140	----	----
6-18-03	ASL/ATL	----	----	36	39
7-14-03	ASL/ATL	130	130	29	28
7-22-03	HML	----	----	38.6	39.9
7-28-03	SRL	----	----	33.0	35.4
8-15-03	HML	162	162	----	----
8-20-03	SRL	149	150	----	----

The spiked samples chromatograms provided by ASL/ATL from the analyses performed on 7-14-03 showed one perchlorate peak in individual chromatograms. No splitting was observable from the chromatograms. Therefore, the retention time for the spiked perchlorate and the retention time for the identified perchlorate match because there was no peak splitting. So, it is very likely that perchlorate was present in the samples (ID. 109814, ID. 109815, ID. 110624, and ID.110625). The four samples were analyzed by HML on 7-22-03 and 8-15-03, and also analyzed by SRL on 7-28-03 and 8-20-03. The HML results and the SRL results further confirm the presence of perchlorate in the four samples (ID.109814, ID.109815, ID.110624 and ID.110625).

## HML Samples

The quality assurance/quality control (QA/QC) review summary is shown in Table 2. The quality control results are generally acceptable. HML did not perform the instrument performance check, but its laboratory control sample was within the control limits, indicating that the system is functioning properly.

The test results handled by HML are summarized below.

<u>Date Analyzed</u>	<u>Laboratory</u>	<u>Perchlorate (ug/L) of samples</u>				
		ID. 010862	ID. 021148	ID. 021152	ID.110624	ID. 110625
3-27-02	HML	ND	----	----	----	----
6-18-03	HML	----	ND	ND	----	----
7-22-03	HML	----	----	----	38.6	39.9
7-28-03	SRL	----	ND	ND	33.0	35.4

<u>Date Analyzed</u>	<u>Laboratory</u>	<u>Perchlorate (ug/L) of samples</u>	
		ID. 109814	ID. 109815
8-15-03	HML	162	162
8-20-03	SRL	149	150

Three samples (ID . 010862, ID. 021148, and ID. 021152) analyzed by HML showed ND. However, the four samples (ID.109814, ID.109815, ID.110624 and ID. 110625) received from ASL/ATL and analyzed by HML showed positive results. These positive results were confirmed by SRL using Ion Chromatography/Mass Spectrometry. Two of the HML samples (ID. 021148 and ID. 021152) with ND were analyzed by SRL using Ion Chromatography/Mass Spectrometry. The SRL results are also ND. The perchlorate results of all samples are summarized in Table 1A. Table 1A shows that the test results between HML and ASL/ATL are consistent and the test results between HML and SRL are also consistent.

## Conclusion/Recommendation

For reasons discussed above, we conclude or recommend as follows:

For the Weck sample, the reported result is not useable because no confirmatory test was performed to resolve whether or not perchlorate was present.

The test results reported by ASL/ATL on 6/05/03 and 6/18/03 for samples with ID.109814, ID. 109815, ID. 110624, and ID.110625 are acceptable. The presence of perchlorate in these samples was confirmed by both HML and SRL.

The test results reported by HML for samples with ID. 010862, ID. 021148, and ID. 021152 are acceptable.

With the exception of the Weck sample result, we have high confidence in these perchlorate results.

Cc: Bart Simmons, Ph.D.  
Cindy Dingman  
Lorna Garcia  
James Cheng

Table 1: Perchlorate Results from Bathtub Well #1 Samples

<u>Date Collected</u>	<u>Lab. Sample ID</u>	<u>Perchlorate (ug/L)</u>	<u>Laboratory</u>
3-20-02	010862	ND	HML
2-21-03	3022540-01	82*	WECK Lab.
5-30-03	109814	150	ASL/ATL
5-30-03	109815	140	ASL/ATL
6-11-03	110624	36	ASL/ATL
6-11-03	110625	39	ASL/ATL
6-11-03	021148	ND	HML
6-11-03	021152	ND	HML

HML – Hazardous Materials Laboratory

ASL/ATL – American Scientific Laboratories/ Advanced Technology Laboratories

ND – Non Detect

\* This result was later revised by Weck Laboratories; the new result was: Non-Detect

Table 1A: Summary of Perchlorate Results

<u>Sample ID No.</u>	<u>Collected</u>	<u>Analyzed</u>	<u>Results (ug/L)</u>	<u>Laboratory</u>
010862	3/20/02	3/27/02	ND	HML
3022540-01	2/21/03	3/03/03	82*	WECK
109814	5/30/03	6/05/03	150	ASL/ATL
		7/14/03	130	ASL/STL
AN00089		8/15/03	162	HML
		8/20/03	149	SRL
109815	5/30/03	6/05/03	140	ASL/ATL
		7/14/03	130	ASL/STL
AN00088		8/15/03	162	HML
		8/20/03	150	SRL
110624	6/11/03	6/18/03	36	ASL/STL
		7/14/03	29	ASL/STL
AN00021		7/22/03	38.6	HML
		7/28/03	33	SRL
110625	6/11/03	6/18/03	39	ASL/ATL
		7/14/03	28	ASL/ATL
AN00020		7/22/03	39.9	HML
		7/28/03	35.4	SRL
021148	6/11/03	6/18/03	ND	HML
		7/28/03	ND	SRL
021152	6/11/03	6/18/03	ND	HML
		7/28/03	ND	SRL

HML = Hazardous Materials Laboratory

ASL/ATL =American Scientific Laboratory/Advanced Technology Laboratory

SRL = Sanitation Radiation Laboratory

\* This result was later revised by Weck Laboratories; the new result was: Non-Detect

Table 2: Data Review QA/QC Summary

QA/QC and Acceptance Criteria	ACCEPTABILITY		
	WECK Lab Sample ID: 3022540-01  (QA/QC Result)	ASL/ATL Sample ID: 110624, 110625 109814, 109815  (QA/QC Result)	HML Sample ID: 021148, 021152 010862  (QA/QC Result)
Holding Times 28 days	YES	YES	YES
Instrument Performance Check Recovery = 80% - 120%	YES (93.9%)	YES (92%, 94.6%)	Not performed
Initial Calibration Correlation Coefficient = 0.99	YES (0.9996)	YES (0.9997)	YES (0.9987, 0.9999)
Initial Calibration Check Recovery = 75% - 125%	YES (95%)	YES (94%, 98.7%)	YES (98.1, 105)
Continuing Calibration Verification Recovery = 85% - 115%	YES (93.3%)	YES (100%, 99.3%)	YES (93%, 106%)
Method Blank ≤ ½ MRL	YES	YES	YES
Laboratory Control Sample Recovery = 85% - 115%	YES (93.5%)	YES (100%, 100%)	YES (96%)
Matrix Spike/ Matrix Spike Duplicate Recovery = 80% - 120% RPD = +/- 15%	YES (106, 106% R) (0%RPD)	YES (92%, 84% 98%, 106% R) (9.1%, 7.8% RPD)	YES (102%, 99.4%, 113%, 116% R) (2.58%, 2.36% RPD)
Identification	Inconclusive	YES	ND
Quantitation		YES	ND